Risk: Ethical Issues and Values

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Poets tell us that the locus of value judgments is the heart. Cognitive scientists have told us that it is the brain. I am here to tell you that it is the stomach. Upton Sinclair learned this when he wrote *The Jungle,* intended to expose the appalling conditions under which recent immigrants to the United States were forced to live. Instead, his discussion of slaughter and packing houses in the Midwest spawned the public outcry that initiated our current laws on food safety and quality. The American public's ability to translate a broad range of social and ethical issues into food consumption issues is truly amazing. Criticisms of bovine somatotropin's impact upon economies of scale in dairy production have been translated into concerns about the safety of milk, and animal rightists' protests against production methods for veal calves have been translated into concerns about the human health effects of eating the meat (Browne, 1987, Burton and McBride, 1989).

The most important ethical value associated with food safety and nutritional quality is human health. Ethical controversies associated with food safety and quality have evolved around the question of when to allow substances into the food chain, and at what levels. The controversy over recombinant bovine somatotropin (BST) appears to raise the same question. The values and decision rules that are applied to the regulation of additives and residues are extremely diverse, and they are not mutually consistent (Halloran, 1986). Part of the diversity and inconsistency arises from competing accounts of health itself (Sagoff, 1985) but this component of the food safety debate will not be discussed

here. There is a pattern of argument in food safety debates that is widespread across policy issues in which scientific evidence is expected to be decisive. The first element of the pattern is criticism of the data, conclusions, or methods that have been used in assembling the scientific evidence. The second element is an inference to the effect that uncertainty in data, conclusions or methods entails risk to members of the public. The final element is an attack upon the motives or values of scientists themselves, who are portrayed as trying to conceal risks and uncertainties from public view (Thompson, 1986).

The public discussion of foods, food additives, and chemical residues produced using techniques of recombinant DNA transfer has yet to move through each phase of this pattern. Nevertheless, the appearance of newspaper articles raising questions about the human health implications of BST would appear to justify the fear that technical solutions to the measurement of human health risk from the products of biotechnology will not resolve the public controversy. If controversial biotechnologies follow the pattern of energy and chemical technologies, ethical values will be interwoven with statements and attitudes about the nature of risk, and with beliefs about evidence and behavior influence risk. Controversy and miscommunication arise to a considerable degree from the public's inability or unwillingness to understand and accept the technical definitions of risk used by the scientific community. This paper will first examine some of the breadth and vagueness in common applications of the word “risk", then will discuss three types of ethical issue that emerge readily from the common grammar of risk, but not from accepted technical concepts.

Qualitative and Conceptual Elements of Risk

“Risk" is a common English word. It can not be appropriated as a technical term without inviting miscommunication.

Scientific research techniques are well suited to the measurement of certain key relationships between exposure to a given substance and the subsequent occurrence of harm. These relationships are important in food safety because high correlations between exposure and harm give cause for concern about the human health effects of exposure to the substance. Though important, the measurable relationships between exposure and harm are misleading policy indicators when they are taken to define risk to the exclusion of qualitative characteristics. One often hears the opinion that scientists study the reality of risk (Starr, *et ai,* 1976; Ruckleshaus, 1983). People who are concerned with other factors relevant to risk are

dealing with mere perception; only the scientists deal with reality. This view of risk is logically insupportable (Thompson, 1990) but what is important here is that it conceals a normative judgment to emphasize the measurable correlations between exposure and harm behind the language of perception and reality. Risk and reality are both politically potent notions. The judgement to emphasize measurable relationships is often justified; taking these relationships to model the reality of risk is not.

"Risk" is a common English word. It cannot be appropriated as a technical term without inviting miscommunication. Careful listening to the way that the word "risk" functions in ordinary speech reveals a varied pattern of use. One variation of particular importance concerns a tendency to use the word risk both as a classifier for acts and as a descriptor of future events. Risk is both a verb and a noun. As a verb, it denotes something that people do. The most common formulations imply intentionality, that is, that when people risk, they do so on purpose (through intentional acts of risk can have unintended consequences). When people run risks they have not consciously taken, the tendency is to shift the word "risk" to its nominative form. Even as a noun, however, risk is ambiguous between its act-classifying and its event-describing meanings. As a classifier of actions, the noun "risk" names those actions that might have been described using the verb form, as in "She risked her life unknowingly by smoking cigarettes." Note that although this act-classifying use of the word does not always imply that a person has knowingly chosen to risk, it does imply that the act in question is an intentional one. We would not, for example, describe an epileptic seizure as "risking one's life," despite the clear indication that there is a significant probability of harm associated with seizures. The reason is that enduring a seizure is not an intentional act. This grammatical pattern allows us to say that, in one sense, enduring a seizure is not a risk, because the seizure is not an intentional act. Calling the seizure a risk in this sense would be a category mistake. The grammar of risk allows "Why do you risk your life by having a cigarette?" but not "Why do you risk your life by having a seizure?".

It is clear, however, that the word "risk" is also used to describe a trait of future events, e.g. that if they occurred they might be harmful. We talk about the risk of an earthquake or a flood, and sometimes even ordinary people say that floods and earthquakes are risks, (though in my experience this form of speech is far more common among risk analysts and scientists). If the word risk is used to describe this trait of events, or if it is used to refer to events having this trait to a strong degree, different grammatical

rules come into play. Since situations such as enduring a seizure are significantly correlated with some probability of harm, they would be clear cases of risk. Indeed, there appear to be no situations that do not involve some degree of risk, at least when it is the event-describing sense of risk that we have in mind. As such, when grammatical rules for act-classifying are applied, an epileptic seizure is not a risk, but when rules for event-describing are applied, it is.

The philosophical grammar that distinguishes these two senses of risk is admittedly subtle (Thompson, 1987a). An epileptic seizure is a risk to one's life, but to have a seizure is not to risk one's life. Simply inverting the word order entails the semantic change. The differences between act-classifying and event-describing uses of risk are not sharp enough to warrant the claim that there are two, fully distinct meanings. Nevertheless, the different uses of the word "risk" suggest opportunities for technical or formal specifications of the term risk that stress event-describing grammar to the exclusion of act-classifying grammar (or vice versa).

The expected value analysis of risk, for example, defines risk as a function of the probability and value (utility) of future events (Friedman and Savage, 1948). Expected values are themselves computed as a function of value or utility associated with the event and the probability of the event's occurrence. There are several ways of representing risk as an expected value. One simple and intuitive function is for all. This concept of risk can be linked to decision-making through the expected utility theory of choice. Although there are several decision rules that can be applied to convert expected utility calculations into action (Rescher, 1983), the simplest one assumes that the objective of decision making is to select the option with optimal expected utility. The option with the highest net expected utility, once costs and benefits are weighed, is the one that should be chosen.

The expected value analysis of risk places a great deal of emphasis upon quantifiable probabilities, plus it is easily linked to a theory of choice. These two factors make it very attractive as a conceptual approach for science-based public policy (Kneese *et al.*, 1983; Freeman and Portney, 1989). The expected value analysis of risk also provides a rigorous and sophisticated development of the event-describing applications of risk that we note in ordinary language. The rigor in the expected value analysis, however, is achieved at the expense of act-classifying shades of meaning that can be detected in the ordinary concept of risk. I suggested above that correlations between exposure and harm are extremely important in setting policy for food safety and quality, but that they do not exhaust the ethically signifi-

cant aspects of risk policy. 1 shall, in the next three sections of this paper, offer some examples of ethically significant issues that are conceptually linked to the act-classifying grammar of risk.

Human Action, Risk, and Responsibility

As noted above, the expected value analysis of risk applies equally well to intentional actions and natural events. One can quantify the fatality risk of driving drunk, of undergoing a seizure, or of being caught in an earthquake. Simple comparison of the expected values makes these events appear morally commensurate, but they are not. We hold people responsible for their action when they drive drunk, but we do not hold people responsible for the consequences of enduring a seizure or an earthquake. The expected value analysis of risk provides no clue as to whether an agent would be held responsible for their actions, or correlatively, as to whether it would be responsible to act in a prescribed way.

We do not classify the seizure or the earthquake as acts, but drunk driving is an act. The act-classifying rules of grammar for risk are part of a taxonomy for sorting different kinds of action. Some actions are considered risks, others are not. The criteria for sorting seem to involve paradigm cases or ideal type classifications, so that judgments as to whether an act is a risk can be drawn by analogy. In our society, driving while drunk is paradigmatic case of risk; driving while sober is not. It also seems that traditional familiarity with the act in question is a criterion. Using the new fangled convection oven is a risk; boiling peas on the stove is not. Here, calling an action a risk is one way of noting that a person will be held responsible for the consequences. It is a way of urging caution, rather than a claim that significant probabilities of harm exist or have been measured.

An idealized depiction of traditional tort law provides the clearest account of how classifying actions under the category of risk plays a role in making decisions and in assessing responsibility. Innovations in the case law of torts during the past two decades have introduced the expected value analysis into liability decisions (Schroeder, 1986), so the following portrayal of torts should not be taken as a description of current practice. Traditional torts are based on common law. The purpose is to assess whether the claimant bringing suit was wrongfully harmed by the defendant, and whether the defendant should be required to pay damages. The claimant may meet his burden of proof by showing that the actions of the accused were risks, then that they actually resulted in harm to the claimant. Simple demonstration of harm is not enough to warrant damage in traditional

torts, for the defendant's act is judged to be a risk only when it is something that a reasonable person would not do. If the act would have been regarded as unexceptional and proper by a reasonable person, the claimant cannot meet the initial burden of proof. The principle implies a general recognition that harm can occur as a result of happenstance, freak events or so-called acts of God, even when the actions of a defendant are completely ordinary acts of the sort that reasonable people perform everyday. Even when the claimant meets the dual burden of proof, the defendant has an opportunity to demonstrate exculpatory factors, and the list of potential exculpatory factors is extensive. They include, for example, whether the defendant acted knowingly and whether the claimant had complicity in undertaking the risky course of action.

The key concept in proving both the initial claim of risk and in providing excuses is that of the reasonable person. In the traditional process of establishing responsibility, there is a large class of actions that are not risks, simply because they are so broadly accepted, even though there are measurable (and perhaps even relatively high) numerical probabilities that they might result in harm. As is generally the practice in common law, criteria for deciding what is a risk and what is not are established by drawing analogies to precedents. These criteria are set forth in judicial opinions and become more deeply embedded into law the longer they endure, and the more broadly they are applied (see Thomson, 1986 for a general discussion of risk in tort law). Laws regulating food safety are statutory and administrative, so the traditional practice of torts may be a poor model. The point is not to advocate reliance upon traditional case law, but to show how this idealization of torts draws upon the act classifying grammar of risk in making a determination of responsibility.

From a policy standpoint, the principal advantages of stressing the act classifying sense of risk arise from its power to link harm with actions for which persons could be held legally or morally responsible. The expected value analysis, by contrast, stresses the sense in which every instance of harm falls into statistical patterns. Since individual persons or corporate groups are clearly not responsible for the statistical pattern, this can make it seem as if they should not be held responsible for the harm that does materialize as a result of their actions.

Equivocation Problems and False Authority

Equivocation upon distinct meanings of the same term is one of the most egregious and indisputably fallacious forms of logical error. Although

equivocation fallacies are conspicuous when exposed, their obviousness does not preclude their occurrence. Equivocation has ethical implications when it is the source of error in judgment, or in communication. Equivocation can also play a role in the creation of false authority, as when a judgment justifiable on one interpretation of the term is imposed upon a situation in which the alternative interpretation would be more appropriate. More serious ethical issues arise when equivocation is used as a deliberate vehicle of deception.

Although simple errors of judgment and intentional deceptions occur in the discussion of food safety literature, false authority may be the most important ethical issue associated with equivocation on the act-classifying and the event-describing meanings of risk. Most people apply the concept of risk in ordinary decision making without being fully aware of the semantic content or logical structure of either act-classifying or event-describing usage. The context of speech is usually sufficient to specify the meaning intended in any given speaker's utterance. If the application of risk concepts implied in each usage were to be specified rigidly, as in the expected value analysis of risk, the result would be two incompatible concepts of risk. The problem of false authority arises when the expected value analysis of risk is applied in such a way as to make otherwise reasonable judgments appear illogical, uninformed, and even irrational.

Acceptability, in other words, implies an intentional attitude toward the act, not mere tolerance on passively enduring a state of affairs.. .It may indeed be a foolish waste of public resources to ensure against harms that are already far less likely to occur than harmful natural events.

One instance of the false authority fallacy occurs when actions for which individual or corporate agents can be held responsible are compared to natural events in order to derive standards for acceptable risk (Starr, 1969). Many naturally occurring substances are estimated to possess greater carcinogenicity than heavily banned additives and heavily regulated chemical residues (Ames 1983). What should we make of this fact? The expected value analysis of risk can be interpreted to imply that there are certain trade-offs between risk and benefit that are acceptable, without regard to the origin of the risks. The preceding discussion of responsibility shows that origins are sometimes important. Although it is clear that the dangers of natural carcinogens have been tolerated or endured by human populations, the expected value analysis of risk begs the question of why we should tolerate or endure similar levels of expected harm from human action (Thompson, 1987b).

When responsibility is important, the permissibility of risk is determined by comparing the act to the standard range of things that human beings do, by considering the importance of the ends sought, and by examining the alternative ways of achieving the end. In this context, the judgment that a risk is acceptable implies that there are overriding moral or prudential reasons for acting in an exceptional manner. Acceptability, in other words, implies an intentional attitude toward the act, not mere tolerance on passively enduring a state of affairs. There is a genuine philosophical issue here. It may indeed be a foolish waste of public resources to ensure against harms that are already far less likely to occur than harmful natural events. The important philosophical issue is not illuminated, however, when the expected value analysis is falsely applied to cases where human agency and responsibility for risk are clearly important.

There may also be elements of equivocation in the so-called "zero risk" debate. When the concept of risk implies a classification of actions, the main point is to use case analogies and the vague notion of a reasonable person to classify an act as risky or non-risky. As noted above, some situations get classified as "no risk" for reasons that have nothing to do with probability, but everything to do with the grammatical rules for act classification. The rules for a "no risk" classification depend upon analogies to unexceptional, ordinary things that any reasonable person might do, as well as to whether the event in question is an intentional act. It is possible, for example, to adopt an act-classifying standard of zero tolerance for risk. The standard prohibits any intentional action that risks health and safety of others. This standard does not imply, however, that there is zero probability of harm for the category of risk may exclude both traditional practices and natural events. Under an expected value interpretation, risk can be zero only when the probability of an event is zero; but it is impossible to reach absolute zero probability using standard statistical techniques. At face value, the Delaney Clause appears to be a zero tolerance statute, and the "generally regarded as safe" (GRAS) list would appear to reflect the reasonable person's judgment of what is and is not a risk. The regulatory interpretation of the Delaney Clause has come to be understood as requiring zero probability of harm, however. If one applies an expected value criterion to the act-classifying standard of zero tolerance, the standard becomes absurd (NRC, 1987). Any situation can be statistically correlated to harmful events! How the Delaney Clause should be interpreted is a serious philosophical issue, but the serious issue is concealed by the law's apparent absurdity, given an expected value analysis of risk.

The problem of false authority relates to the role of science in the policy making process. There are always good scientific reasons for adopting the expected value analysis of risk, and there are sometimes good policy reasons too. When the expected value analysis comes to exclude the multiple shades of meaning that are associated with risk in common speech, however, some of the most natural ways of raising serious issues about responsibility for action appear absurd. People who are applying the grammar of risk in very standard and traditional ways appear to be making logically insupportable statements, and the ethical issues that would be raised by these standard and traditional ways of talking about risk appear chimerical and irrational. The danger is that the appearance of irrationality will be dealt with by handing policy over to experts; only in this case, the criterion for being an expert lies primarily in possessing an impoverished understanding of risk.

Optimizing Versus Informed Consent

So far, the main implications of noting the act-classifying sense of risk have been rhetorical. One should be careful not use the word risk in ways which preclude or diminish the validity of responsibility issues, and one should be careful not to imply false authority by equivocating on act classifying and event describing senses of the word. The last set of implications are more substantial, and less easily resolvable. The expected value analysis of risk fits neatly with a general philosophical commitment to the view that policy should be evaluated according to whether it makes an optimal use of public resources in providing benefits to citizens. This broadly utilitarian view of public policy has long been challenged by opponents who stress consent of the governed. The opponents of utilitarianism hold that government action is legitimate when it is the result of procedures designed to secure or reflect the consent of all who are affected. In many cases these two principles will coincide, but there are no logical entailment relations between them, and there are important issues on which they fail to coincide.

The contrast between optimizing and informed consent is particularly relevant for evaluating questions of risk (MacLean, 1986). Within the area of human health risks, we find a stark contrast between risk policies that seek efficient or optimal levels of public exposure to risk, and those that stress informed consent. Both strategies for assessing and accepting risk are enormously complex in their details. Optimizing, as I use the term here, includes any strategy that applies a threshold or benefit-risk decision

rule to a measured risk, though the application of alternative decision rules can result in very different risk decisions. Regulatory policies administered by the Environmental Protection Agency (EPA) are a clear example of the optimizing strategy. Consent policies can delegate decisions that might have been made by public agencies to the private sector, and this strategy can make it appear that there is no risk policy in place, at all. For example, our policy of allowing choices on accepting the risks of specific disease therapies to be made on the basis of individual doctor-patient relationships is an application of informed consent. The principle of informed consent places the greatest burden of proof upon parties who are active. In standard health care relationships, the active parties are the physician and the patient. If government were to become active in this policy arena, it, too, would have to meet a test of informed consent.

The main point here is to see how the philosophical conflict between optimizing and informed consent occurs in controversies over food and health policy. The continuing controversy over whether and what public health recommendations should be made regarding dietary cholesterol has an element of this conflict. Public health scientists want strong dietary recommendations, for they think that dietary changes will save lives. Others have opposed general dietary recommendations on the ground that, since some (perhaps many) individuals do not need to follow the recommendations, they are deprived of their right to informed choice when given misleading information by public health authorities (Levine, 1986; Kunkel and Thompson, 1988).

The politics of the FDA's attempt to ban substances such as DES or saccharin have also became entangled in the optimizing / informed consent dispute, with neither the optimizers (Rodricks, 1986; Schultz, 1986) nor the advocates of consent (Turner, 1986; Whelan and Havender, 1986), happy with the result. Citing the DES case extensively, Deborah Johnson (1986) has marshalled some of the principal arguments against consent, at least for food safety and quality. She notes that principles of informed consent presume that food consumers are competent judges of food safety and quality, that they have and can interpret all of the relevant information, and that they are not coerced into making one food choice rather than another. Johnson contends that all of these conditions are, to some degree, unfulfilled. As such, she argues, we are forced to develop decision rules for acceptable risk, though she cautions against a too simplistic application of benefit-risk analysis.

Taking the side of consent, Henry Shue (1986) rejects optimizing policy criteria and risk / benefit analysis in particular. Shue thinks that risk policy should be understood as part of governments general responsibility to protect individuals from harm by others. Optimizing strategies tend to conceal the link between risk and harm. He writes that optimizing policies are ".. ,non-starter[s] because ... the numbers of people count, while in matters of rights, the numbers do not ordinarily count. On the contrary, one of the central purposes of rights is to protect the vulnerable, even if they are a small minority." (p. 195) It is only when people have clearly chosen to accept risks that they can be understood to be acceptable.

Informed consent is only loosely related to the act classifying sense of risk, for it is clearly possible to raise questions about consent when risk is understood purely as the probability of harm. There is a tendency, however, for optimizers to gravitate toward the expected value analysis as a way to compare risk with other forms of cost and benefit. Similarly, there may be a greater tendency for questions of informed consent to arise when risk is more transparently taken to be a form of action. One way to discharge one's responsibility in taking risks is to ensure that all parties who are affected have agreed to hold the agent blameless.

Risk is not a real entity or relation that yields its secrets to objective scientific analysis.

Conclusions

My main objective in this paper has been to facilitate food safety debates by pointing out some key sources of miscommunication. Risk is not a real entity or relation that yields its secrets to objective scientific analysis. There are philosophical choices to make about whether to regard risk as primarily a taxonomic concept, for which probability considerations are secondary, or to regard risk as a purely statistical concept. Committing oneself wholly to either option has moral and policy implications that are of tremendous significance.

I would not suggest that insupportable food safety judgments, the public concerns about BST, for example, are any sense justified by the ethical values implied in emphasizing action. They are still silly concerns. Understanding risk as a type of action, rather than as a probability of harm, does indicate a thread of rationality, however. The raising of non-food related concerns about BST may have made the introduction of this technology seem less standard and unexceptional than it might have been. Having been categorized as a risk to the economic well being of dairy farmers, it is

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subjected to much more rigorous conceptual tests than it might otherwise have been. One of these tests is avoidability, whether there is a reasonable alternative. In the case of milk production, there surely is.

There are still some logical fallacies in the chain of reasoning that I have just described, but they are certainly less egregious than simply leaping from the claim that BST may harm the interests of some small farmers to the claim that milk produced with the technology is hazardous to drink. We will, I think, get farther with people who commit such fallacies if we can understand how a reasonable person could arrive at such conclusions than we will by accusing them of emotionalism, fear and irrationality. It is not, however, philosophers who will be called upon to communicate with the public about such risk questions. It is scientists who will have to expose the fallacies with gentleness and tact. It is scientists who will have to demonstrate insight and sensitivity to the non-quantitative factors that inform policy decisions on risk. Rigid adherence to an expected utility analysis of risk will make the scientist's task far more difficult, at least, and may preclude their completing it altogether.

Finally, scientific evidence will not always be the appropriate basis for risk decisions. Sometimes it may be possible and better simply to let people choose the risks they want to take, without even collecting the scientific evidence correlating exposure and harm. Sometimes it may even be better to allow responsibility for risk exposure to be determined in the courts. We currently make huge financial investments in risk assessment, and the scientific assessment of the probability for harmful consequences from biotechnology could cost many times more. Once we have invested heavily in the expected value analysis (both in money and time) it will be hard to ignore the scientific evidence, even if it is inconclusive and irrelevant. There are, in other words, philosophical choices that must be made on the first day of inquiry. Investment in the acquisition of facts has policy implications. In this sense, public policy does not recognize the fact/value distinction. The research and development choices that are made today must be made against a broad, cosmopolitan understanding of the values relevant to food safety and quality. It is, perhaps, the public's confidence in scientific decision makers to faithfully represent the full tapestry of values that will ultimately matter the most. Any tendency to disavow or ignore questions of responsibility for risk will undercut that confidence, and justifiably so.

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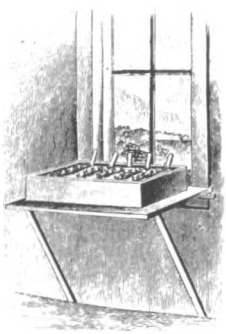

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